Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended): A method of obtaining ~~for preparing~~ polynucleotide fragments for use in polynucleotide shuffling, comprising: ~~exposing at least one homologous heteroduplex polynucleotide to a polynucleotide repair system until said heteroduplex polynucleotide comprises at least one annealed fragment; and denaturing said heteroduplex polynucleotide to obtain said fragment.~~

(a) obtaining a library of homologous polynucleotides from a parental polynucleotide by mutagenesis;

(b) denaturing and hybridizing said polynucleotides to form heteroduplex polynucleotides;

(c) cleaving said heteroduplex polynucleotides by using proteins of a polynucleotide repair system which cleave mismatched base pairs; and

(d) denaturing said cleaved heteroduplex polynucleotides to obtain fragments.

2. (Canceled).

3. (Currently Amended): The method of claim 1 ~~or 2~~, wherein said method ~~the steps~~ occurs *in vitro*.

4. (Canceled).

5. (Canceled).

6. (Currently Amended): The method of claim 1, wherein said heteroduplex polynucleotide is generated from a native gene by successive directed mutagenesis, by error-prone PCR, by random chemical mutagenesis, or by *in vivo* random mutagenesis~~, or by combining genes from gene families within the same or different species~~.

7. (Original): The method of claim 1, wherein said fragments are non-identical.

8. (Currently Amended): The method of claim 1, wherein, ~~said heteroduplex polynucleotide is obtained from a starting library of parent polynucleotides and~~ before exposing said heteroduplex polynucleotide to said [[a]] polynucleotide repair system, promoting formation of said heteroduplex polynucleotide by increasing the number of a parent polynucleotide in said library relative to other parent polynucleotides in said library.

9. (Currently Amended): The method of claim 1, wherein, ~~said heteroduplex~~

~~polynucleotide is obtained from a starting library of parent polynucleotides and~~ before exposing said heteroduplex polynucleotide to said [[a]] polynucleotide repair system, promoting formation of said heteroduplex polynucleotide by denaturing and rehybridizing the parent polynucleotides.

10. (Currently Amended): The method of claim 1, wherein said polynucleotide repair system comprises ~~is a~~ mismatch repair enzyme ~~complex~~, [[a]] base excision repair enzyme ~~complex~~, [[a]] nucleotide excision repair enzyme ~~complex~~, phage T4 endonuclease VII, phage T7 endonuclease I, or a combination of enzymes thereof.

11. (Currently Amended): The method of claim 10, wherein said mismatch repair enzyme ~~complex~~ is DAM methylase, MutS, MutL, MutH, exonuclease, DNA helicase II, SSB protein~~, DNA polymerase III, DNA ligase~~, or a combination of enzymes thereof.

12. (Currently Amended): The method of claim 10, wherein said base excision repair enzyme ~~complex~~ is DNA glycosylase, AP endonuclease~~, DNA polymerase I, DNA ligase~~, or a combination of enzymes thereof.

13. (Currently Amended): The method of claim 10, wherein said nucleotide excision repair enzyme ~~complex~~ is Uvr-A, Uvr-B, Uvr-C~~, DNA polymerase I, DNA ligase~~, or a combination of enzymes thereof.

14. (Currently Amended): The method of claim 1, wherein exposing said heteroduplex polynucleotide to said [[a]] polynucleotide repair system comprises incubating said ~~parent~~ parental polynucleotide with phage T4 endonuclease VII, phage T7 endonuclease I, or a combination ~~conibination~~ of enzymes thereof.

15. (Canceled).

16. (Currently Amended): The method of claim 1, wherein, ~~said heteroduplex polynucleotide is obtained from a starting library of parent polynucleotides and~~ before exposing said heteroduplex polynucleotide to [[a]] said polynucleotide repair system, introducing at least one mismatch per parent polynucleotide.

17. (Currently Amended): The method of claim 1, wherein ~~said heteroduplex polynucleotide is obtained from a starting library of parent polynucleotides, and~~ at least one strand of the parent polynucleotides is methylated.

18. (Original): The method of claim 1, wherein said heteroduplex polynucleotide comprises dITP or uracil-containing DNA.

19. (Original): The method of claim 1, wherein said heteroduplex polynucleotide comprises heteroduplex between DNA and RNA.

20. (Canceled).

21. (Currently Amended): The method of claim 1, wherein said polynucleotide repair

system ~~only~~ partially digests and partially cleaves mismatches.

22. (Currently Amended): The method of claim 1, wherein ~~said heteroduplex polynucleotide is obtained from a starting library of parent polynucleotides, and wherein~~ at least one damaged base is introduced per ~~initial parent polynucleotide~~ parental polynucleotide.

23. (Currently Amended): The method of claim 1, wherein ~~said heteroduplex polynucleotide is obtained from a starting library of parent polynucleotides, and wherein~~ at least one damaged nucleotide is introduced per ~~initial parent polynucleotide~~ parental polynucleotide.

24.-27. (Canceled).